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Student Medicine

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Editorial Comment

EDUCATIONAL ACHIEVEMENT AFTER "EMOTIONAL DROP-OUT"

SOME of the problems which arise when students seek to resume their studies after emotional illnesses have interrupted their college careers were discussed previously in these editorial columns.[1] The writer emphasized the need for continued research in this area to develop criteria which would assure students and others that a history of mental illness will not necessarily bar them from the opportunity to study and to work.

In this issue we welcome the opportunity to publish a report of research undertaken to determine what became of students who dropped out of school because of emotional problems. Harrison, in a careful study at Yale University, presents findings indicating that many such students can complete their education satisfactorily. Almost one-third of the "drop-outs" studied returned to obtain their degree. This of course, does not allow for final evaluation, which can be made only after it is known what degree of success is attained by these students after graduation. Information is lacking also in regard to the group of "drop-outs" who did not re-enter Yale. Did they complete their education at another school? Did they achieve a satisfactory role in life? We hope that future studies will complete the picture.

FOLKLORE VERSUS PROGRESS IN MEDICINE

IT IS usually not difficult for new treatments or drugs to gain wide acceptance, as witness the wave of enthusiasm which follows the introduction of each new antibiotic or other "miracle drug." This enthusiasm, both lay and professional, is matched only by the tenacity with which beliefs in regard to etiology and treatment of disease are

[1] Editorial Comment, *Student Medicine, 3*:53, 1955.

held, even though the beliefs may be without support of proven merit and their sole claim based on long usage, their origin lost in the antiquity of folklore. This is not to belittle real contributions of folklore and the medicines of primitive peoples, such as digitalis, opium, quinine, ephedrine, curare, and other drugs which have gained an established place in modern medical practice.

Perhaps no misbelief is more widely held or influences the everyday life of more people than that relating the weather to colds. We use the word, "misbelief" advisedly, for there is little scientific evidence to support it, and there is considerable evidence against it, to which is now added in these pages a report of a study which showed no correlation between weather changes and the incidence of colds in university students.

As long as the teachings of folklore dominate thinking in any area, progress is slowed. Nothing is more difficult in health education than to get people to unlearn something they have long believed even though it is now proven false. Progress in decreasing the incidence of the common cold will be slow until people accept the fact (we believe it to be a fact) that weather changes have a minor, if any, role in causing colds and until they direct their efforts not to avoiding drafts, dampness, and exposure to the elements, but to the prevention of the spread of respiratory viruses from an infected individual to others. This spread can be lessened by teaching people to avoid crowding in closed spaces and by educating them so that when they have a cold they will avoid intimate contact with others and observe simple precautions such as covering their mouths and noses when they sneeze or cough and washing their hands before they handle things which others may touch.

Leaving College because of Emotional Problems

ROBERT W. HARRISON, M.S., YALE UNIVERSITY

EVERY year many students, perhaps thousands, leave college because of emotional problems. In such instances university officials are faced with important decisions that affect not only the welfare of the individual student but also that of the university. Initially, of course, there arises the question as to whether leaving school is the best course of action. For those students who do leave an appropriate and useful program of activities must be recommended. Eventually candidates for readmission must be evaluated.

In view of the vital nature of the decisions which must be made in this area, it is astonishing that there have been so few systematic studies. Even the skilled and experienced clinician would welcome the guidance afforded by research findings. But perhaps the greatest general contribution of the research data would be the human savings brought about by a re-examination of the assumptions upon which decisions concerning the "emotional drop-out" are based. There are already findings which challenge universally held assumptions. For example, Darling[1] has shown that in some cases even students formerly diagnosed as psychotic may successfully resume their academic careers.

A group of 179 students who for emotional reasons left Yale sometime during the period between September 1947 and June 1952 were studied. The study attempted to investigate: (a) the characteristics of this "drop-out group," (b) the subsequent course of events for these students, particularly with reference to their academic careers, (c) the factors that characterize those students who returned

[1] Case Reports of the Cornell University Infirmary and Clinic, *Student Medicine, 3:* 102-109, 1955.

and those who did not, and (d) variables associated with successful completion of the academic career among members who returned.

All but 6 of the 179 students had been seen in the Division of Student Mental Hygiene at some time prior to their leaving school. It was only at the time they were seeking readmission to the University that these 6 students were seen in the Clinic. A medical leave of absence was granted by the Clinic to 145 of the 173 students who were seen before they left school. The other 28 students either resigned or were asked to leave by the University.

The two sources of data for this study were administrative records and case records in the Division of Student Mental Hygiene. The students' case records yielded the following information: class at the time of leaving, source of referral, date of leaving, diagnosis, number of clinical contacts prior to leaving and following return to college, type of treatment recommended by the Clinic psychiatrist, and whether the student had treatment after leaving school. The administrative records provided information about the student's scholastic performance and his eventual status in the University.

The three experimental groups were: those students who did not return, those students who returned and graduated, and those students who returned and left again. Comparisons were made among these three groups with respect to class, academic status, psychiatric diagnosis, and psychiatric treatment. Tests of statistical significance were made by means of the chi-square technique.

CHARACTERISTICS OF THE TOTAL GROUP

Class and Source of Referral

The largest group of students (76) came to the Clinic referred by administrative personnel (deans, masters, counselors, and others). The next two largest groups were those referred by the Department of Health Medical Staff and those who were self-referred. It is noteworthy that a smaller proportion of cases in this study were self-referred than is true of the total patient group.

Over three-fourths of the total group of 179 students were in Yale College. There was an almost even distribution of the students throughout the four undergraduate years. The largest group of students among the graduates was from the law school (11).

Age and Sex

In the total group of students there were only 5 women, all of them from the graduate group, since Yale College has only male students. The age range of the group ran from 16 to 36 at the time of leaving, with the median age being 21 years.

Treatment prior to Leaving

All but 6 of the students were seeen at the Clinic prior to leaving. The remaining 173 cannot necessarily be considered as having been in treatment in the Clinic. Some students' contact with the Department turned out to be only for the evaluation which led to the recommendation that they leave school. There were some students who were not in treatment at the time of leaving, their psychotherapy having been at some earlier time. Of the 179 students, 112, or 63 per cent, were not considered as having been in treatment when they left. Thirty-seven per cent, or 67, were considered as having been in treatment.

Psychiatric Diagnoses

The diagnoses of the 179 cases were based on the records of the Division, including hospital reports. Where the diagnosis made in the Clinic was incomplete, the records were reviewed by a psychiatrist, who classified them according to the Standard Psychiatric Nomenclature. Table 1 classifies the 179 students according to psychiatric diagnosis.

Table 1. Total group of students classified by psychiatric diagnosis.

Diagnosis	*No.*	*%*
Character disorder	67	37
Psychoneurosis	57	32
Psychosis	52	29
Transient personality reaction	3	2
TOTAL	179	100

The largest diagnostic group is that of the character disorders. Classified as character disorders are those cases in which neurotic or

psychotic symptom formation is minimal and in which the major disorder is found in maladaptive patterns of behavior, e.g., passive-aggressive reaction. This diagnosis is used only when such patterns are relatively fixed and longstanding, as distinguished from adolescent adjustment reactions. It corresponds to the various categories of personality disorder listed in the Standard Psychiatric Nomenclature.

The next two largest groups were the neurotics and psychotics, representing approximately the same number of students. The three students with a diagnosis of transient personality reaction constituted only 2 per cent of the total group.

An examination of the relation between the diagnosis and the class of the student (Table 2) shows that one of the most striking factors is the linear increase in the diagnosis of psychosis from the freshman class to the graduate school group. The increase here is from 11 per cent for the freshmen to 50 per cent for the graduates. This table also shows that the diagnosis of neurosis exists in almost equal proportions from class to class. More freshmen were given the diagnosis of character disorder than were any other group.

Table 2. Relationship between diagnosis and class in total group of students.

Diagnosis	*Total*		*Class*									
			Fresh.		*Soph.*		*Junior*		*Senior*		*Grad.*	
	No.	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%
Character disorder	67	37	19	50	13	39	15	41	11	33	9	23
Neurosis	57	32	12	33	13	39	12	32	9	27	11	28
Psychosis	52	29	4	11	6	18	9	24	13	39	20	50
Transient personality reaction	3	2	1	3	1	3	1	3	..	..	..	..
TOTAL	179	100	36	100	33	100	37	100	33	100	40	100

The relatively high incidence of character diagnoses among the freshmen would appear to represent the effects of the impingement of the college environment on the personalities of incoming students. Those whose character problems render them unable to make an

adequate adjustment to college life tend to come into conflict with the environment early in their academic careers. In the advanced classes these individuals have either left school as a direct or indirect result of their conflicts or have made some kind of adjustment to the academic scene.

Each student's academic standing was rated on the basis of information obtained from the Deans' Offices. For purposes of this study an undergraduate was considered to be in academic difficulty if at the time of the last marking period he was either: (a) on the General Warning list—midterm or end of the term—(b) incomplete in a course, or (c) flunking a course. Graduate students were assigned to this category if their last grades contained a failure or an incomplete.

Fewer students diagnosed as psychotic were found to be in academic difficulty than were those in the other diagnostic groups, a finding significant at the .01 level of confidence. With more than half of the character disorder group in academic difficulty, this diagnostic group was the largest in this category. The greater incidence of academic difficulty among students with character disorder diagnosis was significant at the .01 level. The relationship between diagnosis and academic standing is shown in Table 3.

Table 3. Total group of students' diagnoses and academic standings.

Diagnosis			*Academic standing*			
			Not in difficulty		*In difficulty*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Character disorder	67	100	29	43	38	57
Psychoneurosis	57	100	32	56	25	44
Psychosis	52	100	41	79	11	21
Transient personality reaction	3	100	3	100	..	..
TOTAL	179	100	105	59	74	41

Psychiatrists' Recommendations

Recommendations were given by the psychiatrist in all but 29 of the cases. Of the 150 cases where a recommendation was given, in

137 of them it was to obtain treatment—hospitalization and/or psychotherapy. In a little over one-fifth of the cases hospitalization was recommended, and it was carried out except in one instance. On the other hand, where psychotherapy was recommended, in approximately two-thirds of the cases, it was obtained by only half of the group. Table 4 shows the extent to which the psychiatrists' recommendations were followed.

Table 4. Psychiatrists' recommendations compared to how the students acted on them.

How students acted	*Nature of recommendation**							
	Hospitalization		*Psychotherapy*		*Work*		*Misc.*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Followed through	33	97	53	51	22	81	5	72
Did not follow through	1	3	42	41	4	15	1	14
Unknown	..	..	8	8	1	4	1	14
TOTAL	34	100	103	100	27	100	7	100

* The total group of students who were given advice concerning treatment is represented, but the recommendations total to more than 150 since more than one recommendation was made on some students.

WHAT HAPPENED TO THE 179 STUDENTS

Of the 179 students who left school, 52 per cent had not returned to Yale as of August 1955; 48 per cent had returned. To obtain an over-all picture of the academic fate of these students and to set up experimental groups for further study, the 179 students were divided as follows: (1) the nonreturnees, (2) the returned and graduated, and (3) the returned and left. Table 5 designates the number of students in each category.

Of the 86 students who did return, 31 per cent left again. Over half of the nonreturning group had been out of school six years or longer as of August 1955.

Those students who did not return and those who returned and left again are being made the subject of a follow-up study to further elucidate the factors leading to their failure and the eventual outcome of their disturbances.

Table 5. Total group of students classified according to outcome.

Status as of August 1955	*No.*	*%*
Not returned	93	52
Returned and graduated	59	33
Returned and left	27	15
TOTAL	179	100

The Returnees

Most of those students given a medical leave of absence by the Department of Student Mental Hygiene were required to appear for psychiatric evaluation before readmission to the University. Those students who had been in treatment while out of school were asked to have their psychiatrist submit a report of their progress.

Eighty-six students were readmitted to Yale; 52 of these within a year, 34 after more than a year. Of the 86 returning students, 64 per cent were screened by the Department. Of these 55 students, 41 were seen in readmission interviews, while 14 were screened through correspondence with the student and with his interim therapist, if he had been in treatment while out of school.

Of the 56 students they readmitted, the psychiatrists felt the prognosis for the student's adjusting successfully was good for 42, guarded for 10, and poor for 2. Twelve students seen in readmission interviews were advised not to return, while 11 other students seeking to return were refused admission by their respective Deans.

FACTORS INFLUENCING RETURN

Comparisons were made between returnees and the nonreturnees on the basis of: (1) class at the time of leaving, (2) academic standing at the time of leaving, (3) treatment before and after leaving, and (4) psychiatric diagnosis.

Only academic standing before leaving was significantly ($p < .01$) related to a student's chances of returning; those students in academic difficulty at the time of leaving were much less likely to return than those who were not. There was some tendency for graduate students to be less likely to return and for students who had had treatment in

the Clinic before leaving to be more likely to return. Treatment after leaving did not significantly affect a student's chances of returning, nor did the type of psychiatric diagnosis, as shown in Table 6.

Table 6. Total group of students' diagnoses compared to eventual statuses.

Diagnosis	*Total*		*Eventual status*			
			Nonreturnee		*Returnee*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Character disorder	67	100	36	54	31	46
Psychoneurosis	57	100	31	54	26	46
Psychosis	52	100	25	48	27	52
Transient personality reaction	3	100	1	33	2	67
TOTAL	179	100	93	52	86	48

FACTORS INFLUENCING SUCCESS UPON RETURN

The two groups of students comprising the returnees—the returned and graduated and the returned and left—were compared in regard to: class at the time of leaving, academic status before leaving, psychiatric diagnosis, psychiatric treatment before and after leaving, length of time out of school, and treatment after returning to school.

The three factors of class, academic status, and psychiatric diagnosis were found to be significantly related to a student's chances of successfully completing his academic career upon return to Yale. Graduate students did better ($p < .02$) than any other group of returnees. Students in trouble academically at the time of leaving were much more likely to have to leave again ($p < .01$). Those students given a diagnosis of character disorder were just as likely to fail again as to succeed, while those students having left because of a neurotic or psychotic disturbance had better than a three-to-one chance of succeeding once they returned ($p < .02$). The figures in regard to diagnosis and success upon return are shown in Table 7.

Table 7. The returnees' diagnoses compared to incidence of academic success.

Diagnosis	*Total*		*Incidence of success*			
			Returned and graduated		*Returned and left*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Character disorder	31	100	16	52	15	48
Psychoneurosis	26	100	20	77	6	23
Psychosis	27	100	21	77	6	23
Transient personality reaction	2	100	2	100	..	..
TOTAL	86	100	59	69	27	31

The three factors which had a significant bearing on a student's chances of academic success after he returned—academic standing before leaving, diagnosis, and class—were also found to be significantly related to each other.* A student with a diagnosis of character disorder was much more likely to be in academic difficulty, and the incidence of this diagnosis decreased as the educational level went up. Since the type of personality patterns indicated by the diagnosis of character disorder are shown to be inimical to academic success, one would expect to find a lower incidence of this diagnosis as the educational level goes up. This reasoning is borne out by the finding that 19 per cent of the freshmen in this study were given the diagnosis of character disorder. Fourteen per cent of sophomores, 16 per cent of juniors, 10 per cent of seniors and 9 per cent of graduate students were similarly diagnosed.

Psychiatric treatment, whether obtained before leaving, after leaving, or upon return to school, had no significant effect on whether or not a student remained to graduate once he returned. This was also true in regard to the amount of time a student had been out of school.

* By means of the chi-square technique the relationship between diagnosis and class was significant at the $< .05$ level and the relationship between diagnosis and academic standing at the $< .01$ level.

Discussion and Comment

The meaning of the diagnosis of psychosis in this age group is shown to be less serious prognostically than might be expected from experience with psychosis in the general population. Fifty-two per cent of patients with this diagnosis returned to Yale, and of these 78 per cent continued to graduation. This is comparable to the record of students with diagnoses of neuroses. This tends to support the view that the occurrence of psychosis at this transitional period of psychological development may represent a developmental crisis and, at least in some instances, serves a constructive function toward integration of the personality.

Students who were diagnosed as suffering from some form of character disorder always presented a history of long-standing and firmly established attitudes which interfered with their ability to adapt to the academic scene at Yale. That these attitudes tend to remain relatively fixed is demonstrated by the evidence that although students in this group were as likely to return as those in other diagnostic groups, a significantly smaller percentage remained to graduate. The existence of a character disorder in this special age group, however, does not necessarily imply an unalterable condition, as evidenced by the finding that 16 out of the 67 students on whom this diagnosis was made returned and graduated at a later date. Still others, as will be shown in a follow-up study of those who did not return, are able to find life situations in which they can adapt successfully, including attendance at other educational institutions.

Transient personality reactions led only three students to leave college, although students with this type of disturbance constitute the largest diagnostic group seen in the Division of Mental Hygiene. In general, these reactions, usually adolescent adjustment reactions, can be resolved through treatment and tolerant understanding by the University administration.

It is often assumed that dropping out of college is likely to be permanently damaging to the student's development or to possibilities of eventual academic success. This study demonstrates that this is not necessarily the case. In fact, one is often impressed by the constructive changes which may take place following the experience of dropping out. This includes striking changes in attitude, the resolu-

tion of conflicts—often with the help of treatment—and maturation through the experience of meeting realistic problems.

Perhaps the outstanding impression derived from this study is that there are no absolute psychiatric criteria on which the academic prognosis of students can be based. The trends indicated may be considered as suggestive of the chance of success of students in various psychiatric categories, but they cannot be applied to individual cases with certainty. It is especially valuable to support the impression of Darling that students who suffer from psychotic episodes may, in many instances, resume a successful academic career. In all psychiatric categories there are instances of satisfactory resolutions of problems which interfered with students' education. We believe that each case of student psychiatric illness must be evaluated individually and separately in relation to the advisability of the student's leaving or returning to school. There is no evidence to justify, on medical grounds, categorical refusal to give academic opportunity to a student with a given psychiatric condition. We also believe that dropping out of college may often be a constructive event in the development of the individual student whether or not he returns to college. A follow-up study of those of the group who did not return is being conducted to determine the outcome of their problems.

SUMMARY

1. A study of 179 students leaving Yale sometime between September 1947 and June 1952 because of emotional difficulties showed that they fell into four diagnostic categories: character and behavior disorder (67), psychoneurosis (57), psychosis (52), and transient personality reaction (3). The incidence of character disorder was highest among the freshmen, while there was a linear increase in the diagnosis of psychosis from the freshman to the graduate school group. More than half of the students, with a diagnosis of character disorder were found to be in academic difficulty, as opposed to 44 per cent of those diagnosed as neurotic and only 21 per cent of those diagnosed as psychotic.

2. Eighty-six of the 179 students had returned to Yale as of August 1955. Sixty-nine per cent of these returning students remained to graduate.

3. Only the factor of academic standing before leaving was significantly related to a student's chances of returning to Yale; those students in academic difficulty before leaving were much less likely to return.

4. Three factors had a significant effect on a student's chances of successfully completing his career upon return to Yale: (a) graduate students did better than any other group, (b) students in academic difficulty at the time of leaving were much more likely to have to leave again, and (c) those students given a diagnosis of character disorder were just as likely to fail again as to succeed, while students who left because of a neurotic or psychotic disturbance had a better than three-to-one chance of succeeding once they returned.

5. The three factors which had a significant bearing on a student's chances of academic success once he returned—academic standing before leaving, class, and diagnosis—were also found to be significantly related to each other. The position taken is that the personality patterns which lead to the diagnosis of character disorder interfere with academic success; as a consequence of this relationship it would be expected that class and prior academic standing would relate to success.

Factors Affecting the Incidence of Upper Respiratory Complaints among College Students[1]

RALPH W. ALEXANDER, M.D., AND
JOHN SUMMERSKILL, PH.D.

THE cause of the common cold has long defied identification despite a considerable amount of investigation and an even greater amount of speculation. Evidence has gradually accumulated over the years to the effect that, in the words of Bloomfield, "no serious student of the common cold problem now doubts that the essential cause is a filtrable virus."[2] Nevertheless the belief that the cause of colds is related to weather changes, or to stress and fatigue, is deeply ingrained in both lay and professional persons in our society. This paper will consider the relationship between the incidence of upper respiratory infection in university students, as measured by the number of visits to seek treatment for this condition, and climatological data for the period of observation (September 1948 to June 1952). In addition, the data will be examined for other factors, such as stress or fatigue, which may be related to the observed incidence of upper respiratory disease.

Some of the pertinent research leading to acceptance of the virus theory as the causative agent of the common cold will be briefly summarized. Bloomfield credits Kruse in Germany, in 1914, with first presenting evidence linking viruses with the common cold.[3] In 1916, in this country, Foster reported that, by using methods similar

[1] One in a series of Student Stability Studies conducted in the Department of Clinical and Preventive Medicine at Cornell University, cf. J. Smmerskill and C. D. Darling, A Progress Report on the Student Stability Studies, *Student Medicine 3*:85–91, 1955.

[2] A. L. Bloomfield, Some Problems of the Common Cold, *J.A.M.A.*, *144*:287–292, 1950.

[3] *Ibid.*

to those employed by Kruse, he had been able to produce the usual symptoms of coryza in human subjects innoculated intranasally with filtrates of nasal secretions obtained from typical cases of coryza.[4] In 1929 and 1930 Dochez *et al.* reported the experimental transmission of colds to apes from man, and also from man to man, using filtrates of nasal secretions from subjects with acute colds.[5]

This evidence suggesting that colds are caused by a filtrable virus gave rise to the hope that the riddle of the common cold would soon be solved. One of the big problems hindering the final solution has arisen from the difficulty encountered in establishing that one is always dealing with the same disease entity. There are wide individual differences in the severity of symptoms and in the anatomical parts involved, even though the causative agent is presumably the same. This variability in response of the host plus the fact that recent work seems to establish the existence of several viruses capable of producing disease of the respiratory system results in a broad spectrum of illness.

Various later workers have confirmed the fact that viruses produce disease of the respiratory tract of man. In 1947 the Commission on Acute Respiratory Diseases, established by the Office of the Surgeon General during World War II, reported that it had found that two distinct types of virus produced minor respiratory diseases which could be transmitted to human volunteers.[6] One of these virus infections had a one- to two-day incubation period and produced no demonstrable immunity. The second had an incubation period of five to six days and appeared to produce immunity against reinoculation. Neither infection conferred immunity against atypical pneumonia. In the same year Topping and Atlas reported isolation of a virus which was capable of producing acute respiratory disease in human volunteers after passage through as many as seven allantoic fluid transfers in embryonated eggs.[7]

[4] G. B. Foster, Etiology of Common Colds, *J.A.M.A., 66:*1180–1183, 1916.

[5] A. R. Dochez, G. S. Shibley, and K. C. Mills, A Study of Acute Infections of the Respiratory Tract in the Ape. *Proc. Soc. Exp. Biol. and Med., 26:* 562–565, 1929. A. R. Dochez, G. S. Shibley, and K. C. Mills, Experimental Transmission of the Common Cold to Anthropoid Apes and Human Beings by Means of a Filtrable Agent, *J. Exp. Med., 52:*701–716, 1930.

[6] The Commission on Acute Respiratory Diseases, Experimental Transmission of Minor Respiratory Illness, *J. Clin. Invest., 26:*957–982, 1947.

[7] N. H. Topping and L. T. Atlas, The Common Cold: A Note Regarding Isolation of an Agent, *Science, 106:*636–637, 1947.

More recently Huebner *et al.* have reported isolation of viruses by means of tissue cultures from adenoid and tonsil tissues removed by surgery and from nasopharyngeal and conjunctival secretions and feces of persons with acute respiratory illnesses.[8] The virus strains obtained in 147 isolations were found to be separable into six distinct immunological types. In humans and in rabbits they demonstrated potent type-specific neutralizing antibodies. Surveys made in Washington, D.C., indicate that 50 per cent of infants six months to one year of age have been infected with at least one of these types. By age fifteen most persons have had infections with several types.

Infection with types 1 and 2 were common in children, and type 3 was found to be a common cause for a febrile respiratory illness characterized by nasopharyngitis and conjunctivitis. A small outbreak caused by this type has been reported recently. Parrott *et al.* describe an illness occurring in four children and four adults among the patients and staff of a hospital.[9] Pharyngitis, rhinitis, conjunctivitis, fever, cervical and/or submandibular adenopathy, and liver tenderness were all observed in some one or another of the patients.

Type 4 virus is believed to be identical with a virus, designated RI-67 by Hilleman and Werner, which they recovered from nasopharyngeal secretions of military personnel with acute respiratory infections, including virus pneumonia.[10]

Types 5 and 6 were found infrequently in the population group studied, although type 5 was recovered in a few cases of acute pharyngitis. In some cases of acute respiratory disease none of the six types were incriminated, suggesting that there are additional types of adenoidal-pharyngeal-conjunctival viruses yet to be isolated.

Thus, the virus theory is well supported by experimental evidence. What about other causal agents? What is the influence of certain climatological factors on the incidence of acute upper respiratory infections? Does stress increase susceptibility to such infections? The

[8] R. J. Huebner, W. P. Rowe, T. G. Ward, R. H. Parrott, and J. A. Bell, Adenoidal-Pharyngeal-Conjunctival Agents: A Newly Recognized Group of Common Viruses of the Respiratory System, *New England J. Med. 251:*1077–1086, 1954.

[9] R. H. Parrott, W. P. Rowe, R. J. Huebner, H. W. Bernton, and N. B. McCullough, An Outbreak of Febrile Pharyngitis and Conjunctivitis Associated with Type 3 Adenoidal-Pharyngeal-Conjunctival Virus Infection, *New England J. Med., 251:*1087–1090, 1954.

[10] M. R. Hilleman and J. H. Werner, Recovery of New Agent from Patients with Acute Respiratory Illness, *Proc. Soc. Exp. Biol. and Med., 85:*183–188, 1954.

most frequent affliction of man is what he calls a "cold." The name implies a causal relationship with the temperature, and probably no other disease so affects man's way of life. Every child from the time he can understand is admonished, "Don't get your feet wet" or "Keep your coat on" and the adult hears, "Don't forget your rubbers" or "Don't sit in a draft." Such well-intentioned advice is meant to protect the individual from contracting colds, yet most people can recall times when they did not break such rules and still the dread affliction appeared, or, conversely, when they broke all rules without becoming ill.

After it became evident to the more observant that the common cold had certain characteristics of an infectious disease, attacking in sequence family members and close associates of the victim of a cold, they did not drop the theory of the relationship of the cold to climatic changes but regarded it as a secondary factor, somehow increasing the susceptibility of the individual to the presumed infectious agent. Observations under experimental and naturally occurring conditions do show that the nasal mucous membranes may respond to temperature changes with increased secretion and nasal obstruction. But the question of whether or not the climate causes colds was still not answered with finality. Similarly, the relationship between stress and incidence of upper respiratory infections was not conclusively defined with controlled observations.

METHOD

The data for this study were obtained by a systematic analysis of the medical charts of 793 members of one undergraduate class registered at Cornell University from September 1948 to June 1952. The study group is representative of the Cornell undergraduate population with regard to sex, age, number of veterans, religious preference, and other factors.

A careful search was made for all chart entries of upper respiratory illness. This includes cases with or without fever; with or without hospitalization; and with diagnosis of "upper respiratory illness," "common cold," "grippe," "bronchitis," "virus pneumonia," or "atypical pneumonia." Because records were studied in retrospect

there is no reliable way of establishing whether continuing complaints by a student indicated a single infection or multiple infections. This is a difficult thing to do even at the time of treatment. For purposes of the study an arbitrary decision was made to count attacks separately if at least twenty days intervened between a student's first complaints. The authors believe that in the vast majority of instances the data refer to new, single attacks of upper respiratory illness.

The data undoubtedly include cases incorrectly diagnosed as upper respiratory illness. It is also recognized that students do not report all colds and minor respiratory ailments to the Student Medical Clinic. Consequently the findings presented below do not cover all upper respiratory illness which occurred in this college class. *Defined precisely, the data indicate the frequency with which students visited the Clinic with upper respiratory symptoms as the presenting complaint.* In the authors' opinion frequency of visits is a useful index of frequency of infections for research purposes. Cornell students have comprehensive, prepaid medical care, and 95 per cent of the student body use the Clinic facilities. Services include a Cold Clinic which is maintained for the symptomatic treatment of common colds and which serves as a screening unit for the detection of more serious illness.[11] Each day of the academic year large numbers of students visit the Cold Clinic for prompt treatment of upper respiratory illness. The data from this Clinic are, in all likelihood, more comprehensive than can be obtained from the records of a private practitioner or a general hospital or clinic.

To facilitate analysis of these data the occurrence and date of each upper respiratory illness was recorded on an IBM card for each student. Personal and academic information for each student was also punched into the cards. The analysis was conducted with IBM equipment at Cornell. Meteorological data for the four-year study period were later correlated with the incidence of colds in ten-day periods, as described below.[12]

[11] F. M. McCormick, The Cold Clinic: An Example of the Changing Role of the Doctor and the Nurse in a Student Medical Clinic, *Student Medicine*, *1*:18–22, 1952.

[12] The authors would like to express their appreciation to Professor Harry M. Johnson, meteorologist with the Department of Agronomy at Cornell University. Professor Johnson made this department's data available to us and made valuable suggestions on their usage.

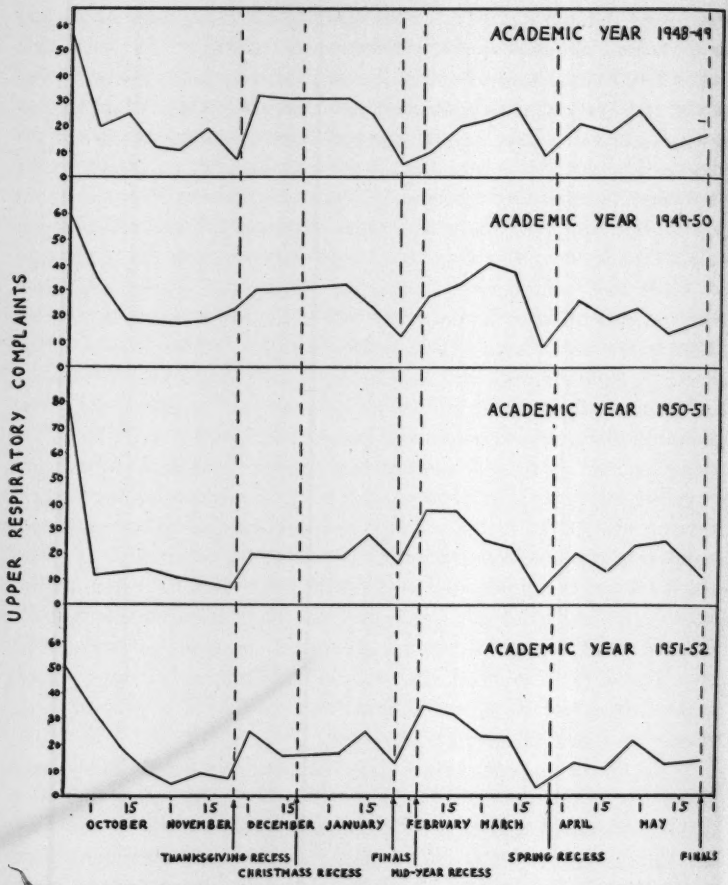

Figure 1. Incidence of upper respiratory complaints among 793 Cornell undergraduates for each of the school years 1948–1952.

RESULTS

Time

Figure 1 shows that the incidence of upper respiratory complaints among college students follows a remarkably similar pattern over the four years studied.[13] The peak period in each year occurs in the first

[13] Inspection of clinic records for other years indicates that exceptions to this yearly pattern occur.

two weeks following return to school in September. The incidence of complaints uniformly declines until immediately following the Thanksgiving recess. There is a fall-off in the last two weeks in January, but this may be an artifact because many students leave the campus as they finish their January final examinations. The incidence figures remain high through February and mid-March then decrease. Complaints increase again somewhat after the Easter recess and decline gradually until the end of the school year.

The most striking fact which emerges from this time graph is that, in general, the incidence of upper respiratory complaints increases each time the student body returns to the campus following a recess. The data also indicate that incidence gradually declines the longer students are in session following a recess.

Figure 2 shows that the composite Cornell pattern for four years is quite similar to the general pattern found among grade school children in Westchester County.[14] The total number of colds found in Westchester is, however, considerably higher. This may be due to the age difference or it may reflect the fact that the Westchester data were obtained by researchers visiting homes whereas the Cornell study depended upon students visiting the Clinic. In any event, peaks in both studies fall around October 1, December 1, and February 1. There is also a slight but distinct upswing in both studies around March 1. The group patterns are cyclical.

The Cornell data were examined carefully for individual cold cycles. We examined the notion that particular individuals have colds each September or each January for example. This notion does not appear to be founded in fact. In general, the date of occurrence of one cold gives no indication at all as to the date on which the individual will experience his next.

Stress

The oft-mentioned idea that individuals under stress are predisposed to colds was investigated in a variety of ways.

Each college year was divided into 22 ten-day periods—11 designated as stressful and 11 as nonstressful.[15] Stressful periods were

[14] J. Downes, Seasonal Differences in Character of the Common Cold Observed in Two Communities in Westchester County, New York, *Milbank Memorial Fund Quarterly, 30*:18–41, 1952.

[15] This part of the research was designed by Eric Hayden, former graduate student in psychology at Cornell University.

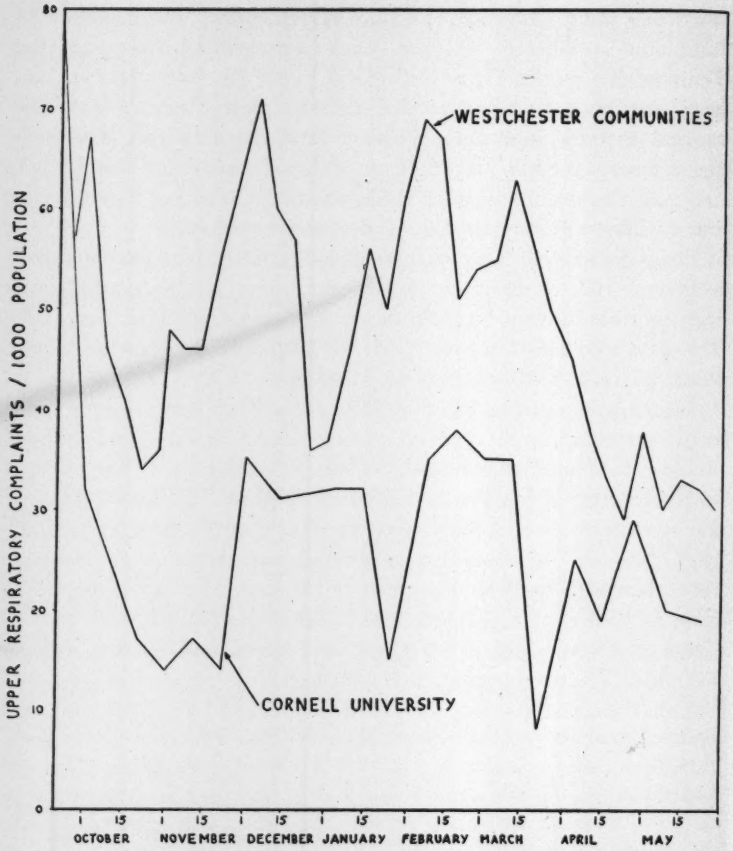

Figure 2. Average yearly incidence of upper respiratory complaints among 793 Cornell undergraduates compared to the incidence of the "common cold" among about 1,800 school children (aged five to eighteen years) in Westchester County from September 1946 to May 1949.

those immediately preceding and following a recess or vacation, examination periods and pre-examination periods, and fraternity rushing periods. Over four years upper respiratory illnesses in the 44 stressful periods totaled 1,056 and in the 44 nonstressful periods

totaled 888. That is, the average incidence on a stressful day was 2.36 as against 1.98 on a nonstressful day. This difference is not statistically significant. The somewhat greater incidence in stressful periods reflects, in large measure, the exceptionally large number of complaints which occur immediately upon return to the university in September (see Figure 1).

We also investigated whether there was a relationship between different kinds of adjustment on campus and reported upper respiratory illness. Phi Beta Kappa candidates in this group were compared with students on academic probation for two or more semesters. There was no significant difference in frequency of upper respiratory complaints. A further analysis showed that the number of academic probations received by a student over four years in no way affected the number of upper respiratory illnesses for which he sought treatment.

There was no difference in incidence of upper respiratory complaints between 84 students in campus leadership posts and 89 students who did not join any campus team, club, committee, fraternity, or sorority. Athletes and nonathletes had similar attack rates. Students who had been subject to disciplinary action by the University did not have an unusual number of upper respiratory illnesses.

The only group studied which deviated significantly from the average incidence figures were the students who had visited the Mental Health Clinic. Among 73 psychiatric patients 85 per cent reported colds during their college careers as against 65 per cent for the study as a whole. These data indicate that where there is exceptional personal stress upper respiratory complaints will be more in evidence. In fact, extended study of psychiatric patients at Cornell show that they have, on the average, a greater number of common medical complaints of all kinds.

Weather

The effects of weather on reported upper respiratory illnesses were also evaluated in a variety of ways.

At the suggestion of the meteorologist, maximum daily readings were used as an index of temperature conditions for the four-year study period. The correlation between incidence of colds and daily

temperature conditions was −.05. This means that over the four-year period there was no relation at all between the existing temperature and the number of colds which students presented.

Change in temperature is thought to precipitate upper respiratory illness. Our data do not support this belief. Incidence of colds was correlated with daily temperature fluctuation, i.e., daily maximum minus minimum temperatures. The resulting correlation coefficient was −.03, which is again negligible. Incidence of colds was also correlated with temperature fluctuation between days, i.e., the amount of change from day to day in maximum temperature readings. This correlation coefficient was +.19, which indicates a slight positive relationship which is too small to be of any practical significance.

Table 1. Mean number of upper respiratory illnesses reported daily under extreme weather conditions from September 1948 to June 1952. None of the differences between pairs of means are statistically significant.

Weather conditions	*Mean daily upper respiratory illnesses*
100 warmest days (avg. max. 71°F.)	2.04
100 coldest days (avg. max. 30°F.)	2.33
100 days of greatest daily max.-min. fluctuation	1.90
100 days of least daily max.-min. fluctuation	2.39
100 days of greatest fluctuation between days	2.26
100 days of least fluctuation between days	2.22
100 days of greatest evaporation (dryest and windiest)	2.58
100 days of least evaporation (wettest and calmest)	2.03

Table 1 shows the effects of extreme weather conditions upon the upper respiratory census in the Clinic. No significant differences were found. During the coldest periods there is an insignificant rise in the number of colds reported. Extreme temperature fluctuations produce no rise at all in reported colds. Similarly, during periods of greatest precipitation where evaporation is minimal (least wind) there is absolutely no increase in visits to the Clinic for upper respiratory reasons.

The data presented in Figure 1 also support the conclusion that

weather has little if anything to do with students' catching colds. Figure 1 shows that the incidence pattern is relatively stable from year to year. Weather conditions are not. Furthermore, upper respiratory illness is *most* likely to occur in late September when cold and dampness are not common.

DISCUSSION

The high incidence of respiratory infection following the long summer vacation and the lower peaks following shorter vacation periods during the school year appear so consistently in each of the four years studied that they must be regarded as significant rather than happenstance occurrences. A similar incidence pattern has been observed in school children (Fig. 2), and a finding similar to the high September peak has been reported among military recruits by the Commission on Acute Respiratory Diseases.[16] In that study, extending over two and one-half years, which covered three respiratory-disease seasons, it was found that the arrival of new recruits was closely followed by a sharp increase in the number of men hospitalized for respiratory infections. The increase was greater if the number of new arrivals was large and less if the number was small.

The reasons for this characteristic pattern of occurrence of respiratory infections is not fully understood, but certain factors seem to offer at least partial explanation. Any immunity produced by the viruses of the common cold seems to be of short duration, in most individuals lasting only a few weeks to several months. Therefore one would expect that during the summer months when the incidence of colds is low many students will lose any immunity they have and return to school susceptible to upper respiratory infections. In classes and other activities these susceptibles are thrown into close contact with other students, with the resultant rapid spread of any respiratory viruses which may be introduced.

Our failure to find a correlation between common stress and the incidence of colds is in agreement with the conclusion reached by the Commission on Acute Respiratory Diseases in their study of military recruits undergoing strenuous training.[17] However, propor-

[16] Commission on Acute Respiratory Diseases, Acute Respiratory Disease among New Recruits, *Am. J. Pub. Health, 36*:439–450, 1946.
[17] *Ibid.*

tionately more students in the group who were at some time patients in the Mental Health Clinic at Cornell sought treatment than was true for the whole study group. Our data do not permit us to determine if they actually experienced more colds, or merely sought treatment with greater frequency. A similar observation has been made by Downes and Simon.[18] They found a greater incidence of respiratory illnesses, of accidental injuries, and of all other acute illnesses in a group of psychoneurotic patients. Observations by Holmes *et al.* indicate that subjects experiencing anxiety, hostility, guilt, frustration, and resentment commonly exhibit symptoms of nasal hyperfunction, i.e., hyperemia and swelling of the nasal mucosa with increased secretion and obstruction of the airway.[19] Further evidence is presented suggesting that emotional states intensify the reaction of the nasal mucosa to other noxious agents, such as pollens in those suffering from hay fever.[20] The suggestion is made that consideration of this summative effect of nasal hyperfunction may help in understanding "other common acute and chronic disorders of the nasal spaces." Such observations tend to support the thesis that students with emotional problems may have more colds than other students. This does not rule out the possibility in our study that the greater number of visits to the Cold Clinic by mental health patients may be an expression of anxiety so that treatment is sought more readily.

Contrary to popular belief we could demonstrate no relationship between the incidence of colds and the weather. Experience of arctic explorers is similar, as they have repeatedly observed that contact with civilization rather than chilling results in catching cold. A careful study in an isolated arctic community (Spitsbergen) indicated that epidemics of colds followed the arrival of the first boat of the season and occurred independently of other environmental factors.[21] In the laboratory Andrewes was unable to demonstrate that chilling increased the susceptibility of human volunteers to cold virus

[18] J. Downes and K. Simon, Characteristics of Psychoneurotic Patients and Their Families as Revealed in a General Morbidity Study, *Psychosomatic Med.*, *15*:463–476, 1953.

[19] T. H. Holmes, H. Goodell, S. Wolf, and H. G. Wolff, Evidence on the Genesis of Certain Common Nasal Disorders, *Am. J. Med. Sc.*, *218*:16–27, 1949.

[20] T. H. Holmes, T. Treuting, and H. G. Wolff, Life Situations, Emotions, and Nasal Disease, *Psychosomatic Med.*, *13*:71–82, 1951.

[21] J. H. Paul and H. L. Freese, An Epidemiological and Bacteriological Study of the "Common Cold" in an Isolated Arctic Community (Spitsbergen), *Am. J. Hygiene*, *17*:517–535, 1933.

inoculated intranasally.[22] We are not aware of any conclusive evidence that weather does in fact cause upper respiratory illness.

SUMMARY AND CONCLUSIONS

The medical charts of 793 undergraduates were carefully reviewed for all visits to the Student Medical Clinic with upper respiratory symptoms as the presenting complaint. The study covers the four school years from September 1948 to June 1952. The chief findings:

1. The incidence of upper respiratory complaints follows a remarkably similar pattern for each of the four years studied. The highest incidence is found in late September with other peaks occurring in December and February.

2. The number of upper respiratory complaints increases substantially each time the student body returns to the campus following a recess.

3. The data do not support the notion that individuals have upper respiratory illnesses at regularly occurring intervals.

4. There is no appreciable increase in upper respiratory complaints during periods of stress in the campus environment.

5. Students in academic trouble, in disciplinary trouble, in campus leadership posts, in varsity athletics, and in other special groups do not visit the Clinic more frequently than the total student group for upper respiratory reasons.

6. Psychiatric patients have significantly more common medical complaints, including upper respiratory illness.

7. There is no significant correlation between the incidence of upper respiratory complaints and daily temperature readings, intraday temperature fluctuations, or interday temperature fluctuations.

8. Extremes of temperature, extremes of temperature fluctuation, and extremes of precipitation and wind do not affect the number of visits to the Clinic for treatment of upper respiratory symptoms.

In general, the results show that the incidence of upper respiratory complaints on a college campus uniformly rises following a recess. The effects of stress and weather appear to be negligible. The findings are interpreted tentatively in terms of loss and gain in immunity to cold viruses as the students leave and return to the campus.

[22] C. H. Andrewes, Adventures among Viruses: The Puzzle of the Common Cold, *New England J. Med.*, *242*:235–240, 1950.

The Use of a College Mental Hygiene Clinic

JAMES S. DAVIE, PH.D., YALE UNIVERSITY

WHEN a clinic exists to serve a community, it is pertinent to inquire whether the facilities of the clinic are differentially utilized by various segments of the community. Such inquiry is simultaneously of administrative and theoretical import. A comparison of users and nonusers of a clinic helps to clarify not only the role of the clinic in the community but also the nature of the problems in which the clinic specializes.

The present paper summarizes the major results of a study of the use of the clinical facilities of the Division of Mental Hygiene of the Department of University Health at Yale University. As part of a larger ongoing study of the undergraduate community, patient and nonpatient populations within the graduating classes of 1953, 1954, and 1955 were compared to determine in what ways, if any, those who used the clinic differed from those who did not.[1] Within each class the patient population was defined as all those who had been seen at the Division of Mental Hygiene at any time during their undergraduate years at Yale. The nonpatient population was defined as all members of the same class who had never been seen at the clinic. Because of the size of the latter group (approximately 85 per cent of a class) random samples of the nonpatient population were taken: a 20 per cent sample in 1953, 40 per cent in 1954, and 25 per cent in 1955.

For each of the three years the patient group was compared with

[1] Although the Division functions as a psychiatric clinic for all students at Yale, the present study is concerned only with the undergraduate body.

the nonpatient sample by the chi-square method on all variables in the study. These variables were of two types (objective and subjective) and came from two sources (the student and university records). The majority of the data came from a mailed questionnaire which focused on the students' future plans and retrospective reactions to and evaluations of selected aspects of their undergraduate experience. It also asked for certain items of information not available or not readily available from other sources in the university. The questionnaire data were supplemented with data on the students' academic, medical, and extracurricular records, which were obtained from appropriate sources in the university.

Since the content of the questionnaire varied somewhat from year to year, and since the direction and significance of association of any single variable with patient/nonpatient status also varied, the present summary is restricted to variables which were included in at least two of the three studies *and* which either did or did not consistently separate the patient and nonpatient groups. Accordingly, the following criteria of relationship are employed. A variable is said to be related to patient/nonpatient status (a) if it appears in all three studies and the direction of association is the same in all three studies and the chi-square is significant at the $p < .05$ level or better in at least two of the studies and (b) if it appears in only two studies and the direction of association is the same in both studies and the chi-square is significant at the $p < .05$ level or better in both studies. A variable is said to be unrelated to patient/nonpatient status (a) if it appears in all three studies and the chi-square is not significant at the $p < .05$ level in any of the studies or if the chi-square is significant at the $p < .05$ level in one study but the direction of association is reversed in either or both of the other studies and (b) if it appears in only two studies and the chi-square is not significant at the $p < .05$ level in either study. Excluding differences noted on an adjective check list which will be discussed below, a total of ninety-two variables appeared in at least two of the three studies. Of these, nineteen were related and fifty were not related to patient/nonpatient status. The remaining twenty-three are excluded from the present paper for failure to meet the above criteria of the presence or absence of relationship.

RESULTS

Satisfaction with College

We shall focus first on those variables related to patient/nonpatient status. These are presented in Table 1 and may be summarized as follows. Compared with the nonpatients, the patients reported they had other than a very good time at secondary school, other than a very or fairly good time at Yale, and were in other than very or fairly good spirits most of the time at Yale. They were more likely to describe themselves as agnostic or atheistic or as having no religious preference. They had more visits to the medical division of the health department and were in the infirmary more often. They were bothered more often by feelings of nervousness and loneliness while at Yale, felt out of place frequently or most of the time, had considered leaving Yale for another college, and felt that their college experience would have been more enjoyable in a smaller college and in a coeducational college. They participated less in athletics and, when describing what they liked most about their experience at Yale, failed to mention the social-interpersonal-extracurricular side of college. They were more likely to write in criticisms of their experience at Yale. They felt they had not lived up to what their fathers expected of them and, in general, reported having quite a bit of trouble adjusting to both the academic and nonacademic phases of college life at Yale. In brief, the patients appear to have had more trouble with their adjustment to college and to have felt their college experience unsatisfactory. Taken together, most of the differences suggest a general syndrome of neurotic complaints.

Self-descriptive Traits

In addition to the differences presented in Table 1, an adjective list included in the 1954 and 1955 studies yielded differences in self-description betweeen patients and nonpatients. Unfortunately, the different sets of instructions accompanying the check lists complicate the comparison of the results of the two studies, but the general direction and tone of the results are similar enough in both samples to warrant reporting them here. Thirty-five of the 160 adjectives in the 1954 study and 66 of the 160 adjectives in the 1955 study were related to patient/nonpatient status at the $p < .05$ level of probability.

Table 1. Nonpatient/patient differences. The first line gives the percentage of nonpatients and of patients giving the response to the variable under consideration in the 1953 study. The second line gives the same for the 1954 study and the third line the same for the 1955 study.

Variable	*Response*	*% nonpatients*	*% patients*
Per cent answering questionnaire		82	74
		74	78
		78	88
Kind of time at secondary school	Very good	55	38
		58	51
		62	47
Kind of time at Yale	Very to fairly good	84	71
		92	72
		89	76
Spirits most of time at Yale	Very to fairly good	74	56
		74	44
		86	66
Religious preference	None	9	25
		12	32
		15	26
Number of medical visits	>9	38	63
		38	79
		25	45
Disabling illnesses	>1	37	52
		26	44
		27	41
Bothered by nervousness	Yes; often	7	22
		*	*
		6	22
Bothered by loneliness	Often**	*	*
		3	25
	Very to fairly often	22	45

* Question was not asked this year.
** Different response categories were used in 1954 and 1955 for this question.

Table 1 (cont.)

Variable	*Response*	*% nonpatients*	*% patients*
Felt out of place at Yale	Frequently to most of the time	10	22
		7	22
		10	27
Considered transferring to another college	Never	74	59
		71	50
		71	58
Would prefer smaller college	Yes	28	39
		27	40
		25	41
Would prefer coed college	Yes	34	44
		32	45
		35	46
Any athletics	Yes	63	48
		63	49
		59	55
Any intramural athletics	Yes	55	42
		53	38
		50	40
Thing liked most	Social-extracurricular-interpersonal	49	37
		48	36
		41	38
Fulfill father's expectations	Not so well to poorly	*	*
		13	25
		11	23
Recommend other changes	Yes	53	59
		37	59
		37	53
Academic adjustment difficulty	Quite a bit to a great deal	*	*
		19	36
		18	37
Social adjustment difficulty	Quite a bit to a great deal	*	*
		13	30
		18	35

* Question was not asked this year.

Of the 138 adjectives appearing in both studies, the 21 which were related to patient/nonpatient status in both studies, despite the different instructions, are presented in Table 2. In both samples the nonpatients tended significantly to describe themselves as dependable, calm, prompt, and self-controlled and to deny being scattered, smug, worrying, dissatisfied, highstrung, idealistic, nervous, rebellious, and tense. On the other hand, the patients tended to describe themselves as anxious, moody, procrastinating, restless, sensitive, dissatisfied, highstrung, idealistic, nervous, rebellious, and tense and to deny being consistent, efficient, relaxed, calm, prompt, and self-controlled. Compressing this list by looking at those adjectives which one group significantly denied and the other significantly accepted as true of itself, we note that the nonpatients describe themselves as being calm, prompt, and self-controlled while the patients deny this. The patients describe themselves as dissatisfied, highstrung, idealistic, nervous, rebellious, and tense while the nonpatients deny this. In brief, the self-descriptions of the two groups support the general conclusion from the data in Table 1, that is, that those who came to the clinic had more troubles and self-concerns than those who did not.

Unrelated Variables

Turning to those variables which were not related to patient/nonpatient status, we find that the patients do not differ significantly from the nonpatients with respect to the following precollege characteristics: home-state, marital status of parents, parent's religion, father's occupational level, mother's occupational status, father's educational level, mother's educational level, Yale father, family income, size of family, type of secondary school attended, and predicted scholastic average.[2]

Many in-college variables were found to be unrelated to patient/nonpatient status. In the academic realm, the patients were as likely as the nonpatients to graduate with honors or orations and to belong to scholastic honor societies (Tau Beta Pi, Sigma Xi, and Phi Beta Kappa). Both groups had similar final undergraduate averages. As for future plans, there were no differences with respect to intended

[2] The predicted scholastic average is based on a combination of the student's secondary school record, aptitude tests, and College Board achievement tests. It is the average he is expected to make his freshman year.

Table 2. Nonpatient/patient differences: adjective check list.*

		1954		1955	
		% nonpatient	*% patient*	*% nonpatient*	*% patient*
dependable	yes**	34	19	82	69
scattered	no	49	34	75	64
smug	no	63	43	92	82
worrying	no	22	10	29	54
anxious	yes	22	43	47	69
moody	yes	19	38	29	50
procrastinating	yes	20	38	50	62
restless	yes	29	43	50	69
sensitive	yes	43	60	69	84
consistent	no	10	24	21	39
efficient	no	10	23	12	32
relaxed	no	12	27	21	47
calm	yes	19	8	53	33
	no	14	28	23	43
prompt	yes	19	8	54	40
	no	12	23	21	39
self-controlled	yes	21	10	72	58
	no	4	18	9	19
dissatisfied	yes	12	30	23	40
	no	43	21	58	46
highstrung	yes	15	30	24	53
	no	44	29	62	34
idealistic	yes	27	43	51	65
	no	20	10	33	19
nervous	yes	23	40	32	59
	no	31	8	49	25
rebellious	yes	10	31	11	26
	no	49	27	69	54
tense	yes	16	33	23	51
	no	34	16	61	25

* In the 1954 study, students were instructed to cross out those adjectives which were definitely not true of them, to check those adjectives which were somewhat more true of them than the majority of their classmates, and to leave blank those adjectives which were about as true of them as of their classmates. In the 1955 study they were asked to cross out those words which were more untrue than true of themselves, to check those words which were more true than untrue, and to circle those where they could not decide.

** yes: subject checked adjective as true of himself.
no: subject crossed out adjective as untrue of himself.

occupational field (business versus professions) and certainty of occupational choice.

Both groups were distributed similarly throughout Yale's ten residential colleges. Their financial status was similar. The percentage of each group receiving scholarships, loans, and student employment was similar. One group was as likely to have cars at Yale as the other.

In the realm of extracurricular participation, there were no differences with respect to participation in some extracurricular activity, participation in some nonathletic activities, and participation in some activity in the residential colleges. Both groups showed similar rates of participation in musical groups, political groups, publications, fraternities, and senior societies.

The groups gave similar responses in naming the undergraduate years which they enjoyed most and enjoyed least and the year during which they felt they developed most and developed least. They did not differ in their endorsement of suggested changes which might have made their college experience more valuable to them.[3] Students' beliefs on the purpose of a college education (to teach one to earn a living versus to teach one to enjoy the living he will earn), the parents' distinction preference for the student (academic versus extracurricular distinction, as judged by the son), and success in fulfilling the mother's expectations of the son were also variables which did not separate the groups.

In brief, the lack of relationship of the above variables to patient/nonpatient status points to the general conclusion that those who used the clinic tended to come from all walks of campus life.

DISCUSSION

One must be cautious in interpreting the results of any user/nonuser study. Involved in the use of a psychiatric clinic are many separate factors, such as the presence or absence of psychological disturbance, the desire for help in surmounting difficulties, the nature and source of help sought, and the possible effect of help received

[3] They expressed desire for more: occupational preparation, liberal emphasis, work required, time for social life, time for extracurricular activities, personal direction in studies and course selection, freedom in course selection, time for intellectual pursuits, personal contacts with classmates, personal contacts with other classes, personal contacts with faculty, discussions instead of lectures.

in coloring the individual's view of himself, his environment, and the interaction of the two. In addition to such general theoretical considerations, one must be aware of limitations in the design of the specific study.

In the present study we were concerned with the similarities and differences of those members of a graduating class who had used the university's psychiatric facilities and those who had not. If we assume that both nonpatient and patient groups were equally honest in their questionnaire responses, we may state that the patient group appears to have more psychological difficulties than the nonpatient group. It appears to be more maladjusted, dissatisfied, and self-deprecatory. Beyond this, one can only speculate as to the meaning of specific findings in the hope that such speculations may guide the course of further research. What, for example, is the meaning of the fact that the clinic sees fewer athletes than expected? Are athletes more "problem-free"? Or do they have as many problems as the nonathletes but attempt to sublimate them through athletic activity? If the latter, what role does the coach play in this process? Is he functioning, consciously or not, as a therapist? What does it mean that failure to fulfill the father's expectations is related to patient status while failure to fulfill the mother's expectations is not? Does this, coupled with avoidance of athletics, suggest that the patients have trouble in assuming the male role? Is it a reflection of an underlying struggle to develop an adequate self-concept? If so, is the tendency toward agnosticism also a reflection of a struggle to develop an identity? Does it represent a rejection of part of one's background as a step toward a more personally meaningful answer to the questions of "Who am I?" and "In what do I believe?" Is the overuse of the medical facilities a further reflection of this general self-concern?

In the realm of negative findings, how can one square the fact that patients seem to come from all walks of campus life with the fact that most of the variables which are not related to patient/nonpatient status are highly important variables in other studies of adjustment to life at Yale and of the degree of satisfaction derived from the total college experience? It seems contradictory, since the patient group appears more maladjusted and dissatisfied than the nonpatient group. At second glance, however, it may simply mean

that these variables are not important indexes of the presence or absence of problems but may be important indexes of the *type* of problem. For an oversimplified example, the ego of an all-A student from an easy high school may be bruised when the student encounters the more rigorous academic standards of Yale. The ego of an upper-class boy from an eastern boarding school my be equally bruised when he does not make the fraternity he expected to on the basis of his social background. Both may come to the clinic but with different types of problems. Accordingly, the variable of secondary school type would be related not to the use/nonuse of the clinic but to the type of problem brought to the clinic by those who use it. In any event, the fact that the patient group comes from all walks of campus life would appear to support the basic rationale for having such facilities available for the college community: namely, that young adulthood, with its attendant problems of emancipation from home, peer adjustment, vocational choice, heterosexual relationships, and so on, is a stressful period and that any student, no matter how outstanding or seemingly well adjusted, may find it helpful to use the clinic's facilities at some point in this period.

The above speculations, reservations, and comments should emphasize the fact that the present study is regarded as one point of departure into the complex area of psychological troubles and their treatment in a college community. Much research is needed in this area from many different viewpoints. For the moment, however, the study of a psychiatric clinic in a college community from a sociological viewpoint indicates that, as might be expected, those members of a typical graduating class at Yale University who have used the facilities of the Division of Mental Hygiene feel more maladjusted and dissatisfied and are more self-deprecatory than those who do not and that, as might not be expected by the nonpsychiatrically oriented, they are likely to come from all walks of campus life.

Case Reports of the Cornell University Infirmary and Clinic

Head Injuries

Dr. Black: "The subject of our discussion today is a student, aged twenty-one. On the day of admission to the Infirmary he had been riding a horse which threw him. After he fell to the ground, the horse's foot apparently struck him on the head. He was unconscious after the fall, and an eyewitness said that he had a convulsion during the period of unconsciousness. Dr. Wightman was called, and the student was conscious by the time he arrived. The injured student was brought to the Infirmary by car, and when he was first seen in the examining room was very irritable and argumentative, repeatedly demanding to be allowed to go home or to go see his horse. He swore he wouldn't stay in more than a half an hour. He did not seem to have any amnesia. Thorough examination was not made at that time, but a preliminary inspection showed a laceration on the parietal area of the scalp, and this was cleansed and sutured. Following that, he was taken to the x-ray room, and x-rays of his skull were taken. Then he was examined in the ward by Dr. Brown, who found nothing abnormal. The pupils were equal, there was no discharge from the nose or ears, and cranial nerves were normal. The tendon reflexes were all present and equal, and the plantar reflexes were equivocal. The pulse was quite regular. Blood pressure was 120/80. Up to this time he was still obstreperous and demanding that he be allowed to leave, but a short while after the examination he vomited his last meal, and immediately afterward his pulse rate was found to have dropped to 58 per minute. It was irregular with extrasystoles. An hour or so later Dr. Brown examined him again and found him drowsy and irritable. The pupils were unequal, the left noticeably larger

than the right. There was a divergent squint from paralysis of the internal rectus muscle of the left eye. The blood pressure was 140/75; the pulse rate was 52 and regular. There was some weakness in the left arm, and reflexes were not obtainable. Forty minutes later he was unconscious, responding only to very strong stimuli. The difference in size of pupils was more marked, the left being widely dilated and the right contracted. The eyes were still widely divergent. The blood pressure was back to 120/65, and the pulse rate was regular at 49. The left arm appeared to move less readily than the right.

"The x-ray of the skull was reported to show a fissure fracture in the right lower parietal area in the region of branches of the middle meningeal artery. Because of the sudden loss of consciousness, it seemed likely now that there was some intracranial bleeding, possibly from the middle meningeal artery which crosses the line of the fracture. Accordingly, the head of the patient's bed was raised to lower intracranial pressure, and a neuro-surgeon was asked to see him.

"In preparation for possible surgery, Dr. Moore started to shave the patient's head. While he was doing this, the patient became more responsive and in a short time started to answer questions. From this time on, the level of consciousness gradually rose. He was seen by Dr. Kane, a neurosurgeon, about six and one-half hours after the accident. On examination he noted that the left eye deviated laterally and the pupil was moderately dilated. The optic discs were normal. There was slight weakness of the left side of the body, including the face. No abnormal reflexes were noted. The neurosurgeon felt that the marked improvement in the past hour was against hematoma and in favor of cerebral edema. He did not advise operation, but suggested continued careful observation.

"Physical examination during that evening showed pupils still unequal but reacting to light. The blood pressure was 115/50, pulse rate was 68. There appeared to be slight weakness of the left arm and leg. All the reflexes were reduced and the ankle jerks were absent. From this time on, there was gradual return to normal. The blood pressure and pulse remained steady. The pupils became normal the following day and reacted normally. The slight left-sided weakness and diminished reflexes persisted for several days. Vomiting occurred several times in the first two or three days after the accident, and, as the oral intake was small, it was thought best to give him one

and one-half liters of intravenous fluids on two successive days. He had a headache for much of the time although he did not complain of it unless asked.

"Examination three weeks after the injury reveals no abnormality except for the weakness of the internal rectus muscle of the left eye. That has remained weak since just after the accident but has improved considerably. Vision in that eye appears to be normal enough if the right eye is covered, but he doesn't use the left eye for reading. I looked at his optic discs and wasn't very sure about them, so Dr. Pritchard (an ophthalmologist) was asked to examine him. He reported that the superior nasal margins of both optic discs were indistinct. The appearance suggested that it was due to myelinated fibers, except that the color was gray instead of white. The optic cups appeared a little diminished in depth. These two changes were felt to suggest subsiding edema of the optic nerves. During this three weeks his behavior has been rather puzzling, characterized by extreme apathy and lack of spontaneity in speech and action as well as in complaint of headache or other discomfort. The headache has been troublesome and persistent and has prevented reading for more than a few minutes at a time. Memory loss for certain periods is noted. You will recall that there was no amnesia when he was first brought to the Infirmary, but now he recalls nothing of the accident and the interval before reaching the Infirmary, but does remember being in the x-ray department and being admitted to the ward. After this there is a complete blank for about the first hospital week. There is no loss of memory for events prior to the accident."

Dr. Wightman: "There is one thing about this divergence of his eyes. His mother has divergence of her left eye that is much more noticeable when she is fatigued. It has been known, and the family doctor confirmed this, that the patient did have a slight divergence even prior to the accident. There has been exaggeration of it since the accident."

Dr. Dennis Brown: "This is a most interesting case from several points of view, and the main purpose of the meeting is to bring this fascinating picture to your notice. We are using it also as an excuse for running over some of the important aspects of head injury in general.

"Fractures of the skull may occur in different regions, and varying

clinical pictures may be associated with each area. If the fracture line crosses the path of the middle meningeal artery, a rather typical clinical picture may develop resulting from tearing of the artery with formation of an epidural hematoma. Our case today has such a fracture, and in the first few hours it appeared typical of a developing epidural hemorrhage. If the fracture crosses the saggital sinus with tearing of that sinus there is a more slowly developing picture associated with subdural hematoma. Fractures of the base of the skull frequently involve some of the cranial nerves and so give another clinical picture.

"A brain injury resulting from trauma is usually classified as concussion, contusion, or laceration, but to these we may add cerebral edema, which we believe is the cause for the dramatic picture in our present case. Intracranial bleeding is listed as epidural, subdural, or intracerebral, depending on its location. Sequelae which may follow more severe degrees of brain damage are posttraumatic atrophy and cicatrix.

"Concussion is defined as a disruption of the physiological activity of the brain which results in a temporary loss of consciousness. The actual mechanism of it is a subject of much theorizing, but it is generally believed that there is no gross physical injury to the brain. Concussion isn't very serious in itself, and there is no specific treatment for it. It is generally held that the patient need not be kept in bed very long because excessive bed rest is liable to give rise to an increase in neurotic symptoms.

"Contusion of the brain which usually follows more severe injuries is difficult to distinguish from concussion. In contusion there are multiple petachiae found in the cerebral tissue due to rupture of the small vessels. The only way we can distinguish contusion is that the unconsciousness in likely to last longer than in most concussions. One complication of contusion is involvement of the heat regulatory mechanism in the brain, and the resulting hyperthermia requires specific treatment. Short of that there is no specific treatment for contusion of the brain.

"Lacerations of the brain are serious, and generally speaking there is residual damage which causes organic symptoms. Often surgical intervention is required to remove devitalized tissue. The fractures themselves are not of very great significance. In olden days fractures

of the skull were thought of with superstitious awe, the presence of fracture being considered a criterion of the amount of damage done to the brain tissue. Fractures are not of great importance unless compound or depressed. If compound, the possibility that the brain might become infected from the outside is greatly increased, and specific treatment, particularly the use of antibiotics, is indicated. Compound fractures, as you know, include fractures involving the paranasal sinuses and the middle ear. Recognition of depressed fractures is important because surgery is frequently necessary to elevate the depressed bone and thus lessen the likelihood of scarring and subsequent focal epilepsy.

"In this particular case the most striking thing was the simulation of middle meningeal hemorrhage. Middle meningeal hemorrhage which gives rise to epidural hematoma occurs from a tear in the meningeal artery, but it also can occur from a major venous sinus tear—in that case the picture is not so typical because the bleeding is slower. Classically in epidural hemorrhage there is the lucid interval. The patient is knocked unconscious at the time of the injury, regains consciousness, and then lapses back into unconsciousness. The mechanism is that the clot causes local compression of the brain tissue; compression of the veins causes a certain amount of edema too. The most striking thing about a middle meningeal hemorrhage is the rapidity of the deterioration. After twelve hours have elapsed, the chance of getting middle meningeal hemorrhage is practically nil. Therefore, the patient must be watched extremely carefully for the first twelve hours after any head injury, with particular note being taken of the blood pressure and the pulse. The pulse will fall and the blood pressure will rise if epidural hemorrhage is occurring. Pupil changes, changes in the visual fields, changes in the cranial nerves, and convulsions are all things that have to be looked for carefully. Changes in the pupils, particularly inequality, may be seen in many cases, with dilation of the pupil on the same side as the hemorrhage being the most frequent finding. The mechanism of it is generally held to be stretching of the occulomotor nerve. So it is a rather rapid return to unconsciousness, or a progressively deepening coma in those cases which do not have a lucid interval, which suggests the diagnosis of epidural hemorrhage. Once the diagnosis is made, speed is essential; burr holes have to be made so that the middle meningeal

artery can be tied off and the hematoma evacuated.

"After the first twelve hours, if the patient should become unconscious, the injury is more likely to be subdural hemorrhage, which is generally due to tearing of the sagital sinus. It may be acute, subacute, or chronic in type. The pictures are distinct in these various types. Tearing of the saggital sinus is more likely to occur if the trauma is applied to the front of the head or the back of the head rather than if laterally applied. The brain is relatively rigid in the anteroposterior plane, and this prevents excessive lateral movement. In acute subdural hematoma the first few days after the injury are critical; after two days have elapsed it is unlikely that acute bleeding is going to occur. As the brain has time to accommodate itself to the slow increase in pressure resulting from sinus bleeding, the signs are those resulting from increasing intracranial pressure. Impairment of vision, especially diplopia and visual field defects, is prominent. Weakness, reflex changes, and speech disturbances may also occur, but much later than in the acute type; the average length of time for their appearance is three weeks. They may be delayed for several months, coming on after the injury itself has been forgotten. It is in these cases that differentiation between a subdural hematoma of the chronic type and an intracranial neoplasm is difficult. It is worth remembering that 50 per cent of the cases of subdural hematoma are bilateral, and therefore an x-ray looking for shift of the pineal body may not be of any help; in fact, it may be misleading. Another important thing to remember is that the maximum incidence of subdural hematoma is in the age group between forty and seventy years. Ventriculography and arteriography may be used to aid in the diagnosis and localization of chronic subdural hematoma.

"The third type of bleeding is intracerebral bleeding, which usually is impossible to distinguish from subdural hematoma. The symptoms and signs are exactly the same, coming on sometime after the injury and gradually increasing in intensity just as with subdural hematoma. The correct diagnosis is usually made at operation when no subdural bleeding is found. Treatment depends on the size and situation of the intracerebral hematoma. If it is deep it is usually left alone, and it may be absorbed or replaced by a small cyst or diverticulum from the ventricle.

"This boy presented a picture simulating middle meningeal hemor-

rhage, and we felt sure that it was middle meningeal hemorrhage until about the time Dr. Kane came. It was the speed of recovery that made us realize that he could not possibly have any intracranial bleeding, as it would not be resolved so rapidly. We believe that it must have been cerebral edema. This condition, cerebral edema, is recognized as simulating meningeal hemorrhage. Dr. Kane has had a case of a fourteen-year-old boy who presented the same picture as this boy. He was taken into the operating theater, and his head was shaved and cleansed. Dr. Kane thought he saw a flicker of an eyelid, so before he continued he opened the boy's eyes, and thereupon the boy sat bolt upright and said, "What the h—— is going on here?" Probably most surgeons would be able to tell of similar cases, but there is very little in the literature about cerebral edema. In 1950 Pickles, writing in the *New England Journal of Medicine,* pointed out that focal cerebral edema was first described in 1897 but had been neglected since.[1] He described the condition found in eight children, aged ten months to eleven years, and he reported that in his large neurosurgical experience he had never seeen it in an adult. He found that signs developed in fifteen minutes to six hours with unilateral reflex changes and perhaps Jacksonian or generalized convulsions and one-sided paralysis. He found that clinical evidence disappeared in from three to twenty-four hours. In our case signs disappeared more or less completely in about six hours. The patient was drowsy and perhaps not mentally alert for several days afterward, but whether that was due to edema which persisted or to part of the concussion syndrome we don't know. Some of the reported cases have been operated on, and at operation swelling was noted. Recovery followed quickly after this decompression operation.

"In regard to the mortality and the sequelae of head injuries, I should like to refer to a paper which appeared in the *Archives of Neurology and Psychiatry*—a report presented at a joint meeting of the New York and Philadelphia Neurological Societies.[2] This is the most recent report that I have found. Olsen *et al.* had 1,000 patients with head injuries occurring between the years 1945 and 1950. Of these 1,000 cases, 430 had no brain involvement, but only scalp and

[1] W. Pickles, Acute Focal Edema of the Brain in Children with Head Injuries, *New England J. Med., 240:*92–95, 1949.

[2] A. K. Olsen, A. Willin, and H. L. Rosomoss, Review of 1,000 Patients with Head Injuries, *Arch. Neurol. and Psych. 72:*787–788, 1954.

facial injuries. The remaining 570 had varying degrees of cerebral injury. Of these, 442 had concussion and 128 had severe brain injury. Of the 128 with severe injury, there were 38 with subdural hemorrhage, with a 63 per cent mortality rate; 11 had epidural hemorrhage and 81 per cent died; and 2 patients had combined epidural and subdural hemorrhage and both died. The over-all mortality of the 1,000 was 7.4 per cent. As you see, the mortality was severe, particularly if there was subdural and epidural bleeding. One of the most common causes of death was respiratory complications, chiefly airway obstruction due to retained secretions, pharyngeal relaxation, and laryngeal edema. Such complications were seen in 30 cases, and of these 24 died. Tracheotomy was performed in 20 of these cases and 6 survived. This suggests that tracheotomy may be a life-saving procedure, despite the fact that respiratory obstruction is secondary to brain-stem damage. In discussing this paper, Denker suggested that in addition to x-ray examination lumbar puncture should be done as a further aid in diagnosing fracture, because x-rays will show only 50 per cent of the fractures in the base of the skull. It is probably unwise to do lumbar puncture in a case with signs of rapidly increasing intracranial pressure.

"The most common sequel of head injury is the "postconcussion syndrome" characterized by complaints of persistent headache, dizziness, impaired memory, inability to concentrate, and perhaps personality changes. These may follow even minor injury which did not produce loss of consciousness. Such symptoms following injury which seems insufficient to cause permanent brain damage have been widely held to have a large neurotic component. The true nature of the symptoms is difficult to determine because in some cases patients may benefit from litigation and compensation proceedings by misrepresenting their symptoms, either consciously or unconsciously. In many cases it is difficult to determine if the symptoms are due to residual brain damage, to neurosis, or to malingering. There is a growing body of opinion that the postconcussion syndrome in the majority of cases is a result of residual brain damage. This view is supported by the observation that the symptom complex is the same regardless of the basic personality type of the patient and, further, by the finding of abnormal electroencephalographic tracings in from 20 to 55 per cent of cases.

"It is important to distinguish between traumatic neurosis in which the neurotic symptoms represent a distinct change in personality type and neurosis in which trauma has been merely an insignificant episode in an individual previously showing neurotic behavior. Neurosis and malingering can best be distinguished from one another when one considers the total situation. Sometimes true malingering can only be deduced from observation of the behavior and the remarks of the patient when he does not know he is being observed.

"This question about previous personality is important in our case because of the odd behavior of the patient since the accident. He seems a bit self-willed, obstinate, and withdrawn, with little interest in what goes on about him. We have learned, however, that this is not a real change but in large measure is an expression of the basic personality.

"Headaches are usual rather than unusal sequelae of head injuries, and they can best be treated by reassurance that the head injury is not serious and that the headache will disappear in time. Of the other sequelae: intellectual deficit depends on the structural damage; hemiparesis usually improves with lessening speed over several months; impairment of reading and writing ability may improve with special training, but a permanent residuum is likely. Involvement of the cranial nerves due to fractures of the base of the skull are usually permanent. Loss of vision due to optic nerve injury rarely shows improvement, but involvement of optic motor nerves generally shows a tendency to recovery, although exercises or operation may be necessary. In our first case there is persistent weakness of the internal rectus of the left eye; this may be an aggravation of something which was there before. It has tended to improve slowly and we hope to see it continue to improve. Facial paralysis often clears, but if it persists it may be necessary to operate to open the facial canal and decompress the facial nerve. Injury of the eighth nerve is apt to cause permanent hearing loss. Epilepsy occurs particularly after open injuries, being found in from 30 to 50 per cent of cases. It may be well to put every patient who has had an open brain injury on prophylactic phenobarbital continuously for five years. At the end of five years it can gradually be withdrawn if seizures have not occurred."

Dr. Darling: "If his irritability immediately after admission had become more severe instead of lessening, what kind of sedative would have been acceptable in such a case?"

Dr. Brown: "A barbiturate could be given with caution, but one prefers not to give anything which is liable to depress the medullary centers."

Dr. Wightman: "There are two things I might add. First, when he was unconscious, I applied pressure to his finger nail bed, and at that time he exhibited a sign that I regard as somewhat ominous, and that is yawning. And second, he seemed to improve after elevation of his head. This increases the possibility of inhalation of vomitus or the retention of secretions, but it must be weighed against the advantages of elevation of the head."

Dr. Brown: "Some years ago attempts were made to reduce cerebral edema by dehydrating the patient by means of fluid restriction and the intravenous administration of hypertonic solutions. It is contraindicated if there is bleeding. Dr. Kane advised against this treatment, but recommended elevating the head of the bed."

Dr. Moore: "Several years ago in discussing head injuries Dr. Van Wagenen made the point that we should get the heads of these patients up in the air. After all, drainage is downward, so we should not increase the difficulty of venous drainage by keeping the head down. He emphasized posture but also stressed the need for care to avoid aspiration pneumonia. This patient may have had some brain laceration too. I don't seee how you can rule out injury other than cerebral edema."

Dr. Brown: "With laceration there are generally residual neurological signs. No persisting signs have been apparent apart from the weakness of the internal rectus muscle. It makes the likelihood of brain laceration very remote, I think."